Silicon Storage Technology, Inc.

User's Manual

Boot Strap Loader Demo Kit

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User Manual for the FlashFlex51 Boot-Strap Loader Demo Kit (P/N: SST89CK77BSL)

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Introduction

The User Manual for the FlashFlex51 Boot-Strap Loader (BSL) Demo Kit provides the user with the detailed information to quickly learn and use the kit. The manual, written for the user of Windows 95/98 and DOS, walks the user through getting started, system connections, hardware description, installing the software, how to use the software, a description of the demo software, and a step-by-step procedure for a quick demo.

For future upgrades to this document, visit the MCU page on the SST Website, which is www.SuperFlash.com.

Getting Started

Unpacking the Demo Kit

The demo kit consists of the following items:

1. Hardware
   - BSL Demo Board
   - 6-ft. DB-9 RS-232 Cable
   - AC Adapter

2. Floppy Disk – v2.0A(Windows 95/98), with the following contents:
   - Three demo programs (.a51 and .hex) - reside in folder "DemoProgram":
     - binctr.a51/.hex
     - twoball.a51/.hex
     - pendb.a51/.hex

     The demo programs (.hex) are to be downloaded from the PC.

   - External Memory Mode BSL program – resides in folder "ExtMemMode":
     - f51eble2.a51/.inc/.hex
     - reg52a.inc

     The hexadecimal code (.hex) needs a programmer to reprogram it into the external flash memory chip U3 (SST39SF010 MPF) located on the demo board.

   - Internal Memory Mode BSL program – resides in folder "IntMemMode":
     - f51mble2.a51/.inc/.bin/.hex
     - reg52a.inc

     If the binary code (.bin) is downloaded, it is sent to block 1 flash memory, or if the hexadecimal code (.hex) is downloaded, it is sent to block 0 flash memory. The program code is configured for 11.0592 MHz, 38.4 KBaud operation with an 89C58 device.

   - Windows 95/98 executable code and MFC library files – reside in root directory:

- FlashFlex51.exe
- Mfc42.dll and msvcrt.dll

The PC executable code (.exe) is designed for Windows 95/98. Two MFC library files (.dll) are associated with PC executable code.

3. Floppy Disk – v1.1D (DOS), with the following contents:
   - Three demo programs (.a51 and .hex) - reside in folder "bsl_demo":
     The description of these programs is the same as for item 2 above.

   - External Memory Mode BSL program – resides in folder "bslmpf11":
     - f51eble2.a51/.inc/.hex
     - reg52a.inc

     The hexadecimal code (.hex) needs a programmer to reprogram it into the external flash memory chip U3 (SST39SF010 MPF) on the demo board.

   - Internal Memory Mode BSL program – resides in folder "bslmcu11":
     - f51mble2.a51/.inc/.bin/.hex
     - reg52a.inc
     - f51pblb3.exe
     - Readme.pdf

     If the binary code (.bin) is downloaded, it is sent to block 1 flash memory, or if the hexadecimal code (.hex) is downloaded, it is sent to block 0 flash memory. The program code is configured for 11.0592 MHz, 38.4 KBaud operation with an 89C58 device.
     The PC executable code (.exe) is a menu-driven PC (DOS) interface code communicating with the MCU BSL firmware.
     The document file (.pdf) is the corresponding Readme file for the users of BSL v1.1D.

   - Documentation
     - Bsl_kit_UserManual.pdf
     - Bsl_schematic.pdf
     - Readme-v20A.pdf

     The bsl_schematic.pdf provides the circuit diagram of the BSL Demo Board. The Readme-v20A.pdf is the corresponding Readme file for the users of BSL v2.0A.

System Requirements

<u>Windows 95/98</u>

The minimum hardware and software requirements are:

- Processor: Pentium or above
- RAM: 32 MByte
- Hard Disk Free Space: 2 MByte
- Operating System: Windows 95/98

DOS

The minimum hardware and software requirements are:

- Processor: 80486 or above
- RAM: 1 MByte
- Hard Disk Free Space: 1 MByte
- Operating System: DOS 6.2

Connecting the System

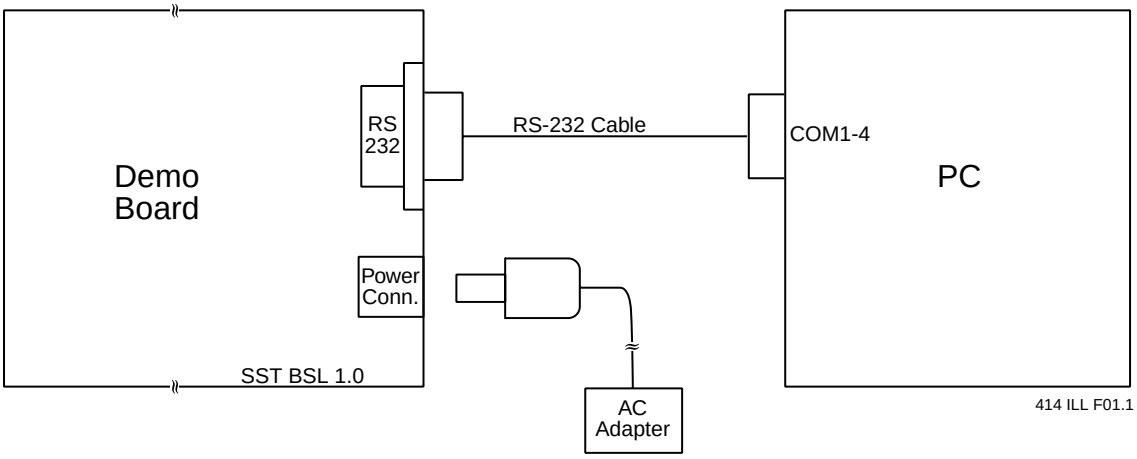


Figure 1. BSL Demo Board External Interfaces

Figure 1 shows the connections required to run the BSL Demo Board. The kit AC Adapter, with a standard 0.2178 in.(5.5 mm) OD and 0.098 in.(2.5 mm) ID barrel connector, provides the DC power to run the board. The connector is inserted into the board power connector as shown. The specifications for the AC adapter are:

AC Input: 120 VAC, 60 Hz, 6 Watts
DC Output: 9 V, 300 mA

The 6 ft. DB-9 RS-232 serial cable (male/female) is next installed between the demo board and the COM1/COM2/COM3/COM4 port of the interfacing PC. The hardware connections are now complete, and the system is ready for software operation, which is discussed below.

Hardware Description

In Figure 2 is shown the major components of the BSL Demo Board. Now the different board functions are briefly explained. The detailed circuit schematic is presented in the document file Bsl_schematic.pdf.

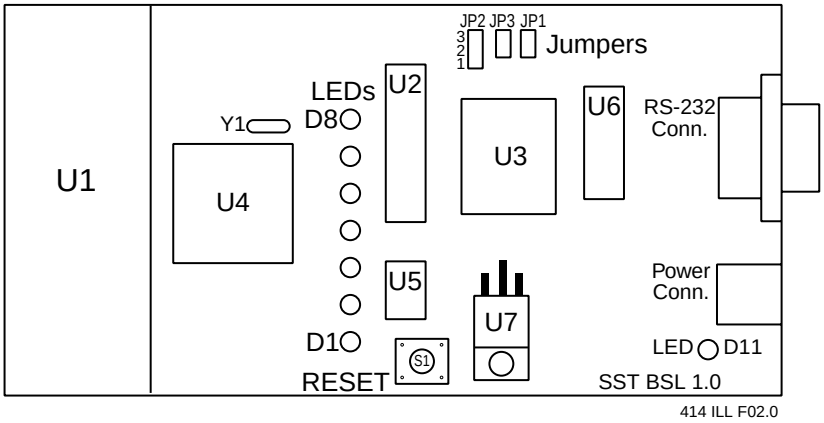


Figure 2. BSL Demo Board Components

Jumpers

The following table lists the default and alternative settings of the individual jumpers:

Jumper Settings:

Jumper	Default Setting	Alternate Setting
JP1	(closed) Start BSL Code after Reset	(open) Start User Code after Reset
JP2	(2+3) Internal Flash Active	(1+2) External Flash Active
JP3	(closed) LEDs D1-D8 are connected to Port 1	(open) LEDs D1-D8 are not connected to Port 1

MCU

There are two MCU sockets on the board: a PLCC socket (for U4) and a PDIP ZIF socket (for U1). The board connections between sockets are in parallel, so that a MCU in either socket can be used for a BSL demonstration.

Clock

On the demo board, a fixed clock frequency of 11.0592 MHz is derived by attaching crystal Y1 to the internal oscillator of the MCU. Internal components of the MCU, associated with the baud rate, are selectively programmed during system initialization according to precalculated values dictated by the operating frequency. For that reason, the crystal is soldered onto the board to insure that a reliable serial data communication is maintained.

Power

+5V board power is derived from an on-board regulator circuit, centered upon the LM7805C or equivalent voltage regulator chip (U7). The kit AC adapter transforms its 120VAC input into a +9V DC output, which is fed into the Power Connector on the board and provides the input to the regulator circuit.

Reset

A hardware reset is accomplished using a dedicated reset chip (U5), either a DS1706L or a MAX813LCP. When the Reset button (S1) is pressed, the RST output signal from U6 goes to a logic High to reset the MCU.

RS-232

Serial communication between the PC and the Receive (P3.0 RxD) and Transmit (P3.1 TxD) pins of the MCU utilizes an RS-232 Interface chip (the MAX232ACP chip in U6) to perform the signal level shifting required for RS-232.

LEDs

Jumper JP3 enables or disables power to the eight (8) LEDs, which are tied to the Port 1 pins. The LEDs can be operated singly or together to provide user visibility of software operation.

External Flash Memory Chip

The program in the External Flash Memory Chip (U3) allows the IAP commands executing from the external memory device to program block 0 and 1 of the MCU (U1 or U4) internal flash memory. This function allows the PC executable code to download the BSL code into block 1 of the MCU internal flash memory. Jumper settings for the IAP commands operation are: JP2 = (1+2) and JP1 can be either open or closed.

Note: If a SST89C54/58 MCU chip is in Level 4 Security Lock, then IAP operation is inhibited.

Installing the Software

Windows 95/98

To install the executable software on the PC, insert the kit's floppy disk (labeled as v2.0A) into the floppy drive of the PC. Next perform the following steps:

1) Create a new folder, e.g. SSTBSL_V20A, and copy the following file(s) into it:
   SSTFlashFlex51.EXE
   MFC42.DLL*
   MSVCRT.DLL*

*Copy this file when Windows' Operating System error message asks for it. See Step 3-1 in next section for a description of the error message.

2) Copy the following folders from v2.0A floppy disk into the new folder:

ExtMemMode
IntMemMode
DemoProgram

DOS

To install the executable software on the PC, insert the kit's floppy disk (labeled as v1.1D) into the floppy drive of the PC. Next perform the following steps:

1) Close all Window programs and exit to DOS.

2) From the DOS prompt, create a sub-directory by typing:

"C:\>MD C58-11MH".

3) From the DOS prompt, change to the newly created sub-directory and copy the PC executable and demo programs from the floppy disk. Type:

C:\>CD \C58-11MH <enter>
C:\ C58-11MH >COPY A:\BSLMCU11\F51PBLB3.EXE <enter>
C:\ C58-11MH >COPY A:\BSLMCU11\F51MBLE2.HEX <enter>
C:\ C58-11MH >COPY A:\BSL_DEMO\BINCTR.HEX <enter>
C:\ C58-11MH >COPY A: \BSL_DEMO\TWOBALL.HEX <enter>
C:\ C58-11MH >COPY A: \BSL_DEMO\PENDB.HEX <enter>

Once the PC executable is established, the user is ready to execute IAP commands from either External or Internal Memory Mode and download one of the demo routines.

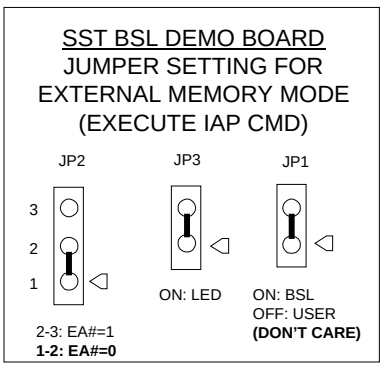
How to Use the Software

Windows 95/98

The MCU is an SST89C54/58 Rev.C1 or later and "unlocked". The following sixteen steps walk the user through setting the external/internal memory mode, downloading the BSL code or demo routines into internal flash memory, executing the memory-remap command, uploading the code from internal flash memory and saving them as a disk file, and locking the MCU chip.

Step 1. Prepare the Demo Kit for Running SST BSL v2.0A Program

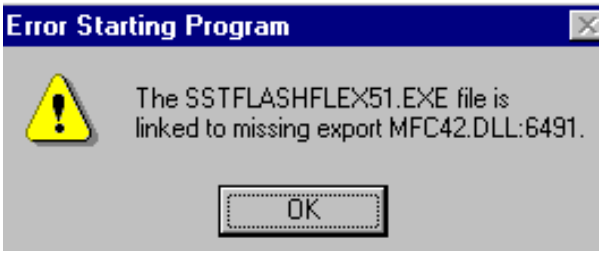
1-1. Make the following jumper settings for External Memory Mode operation:



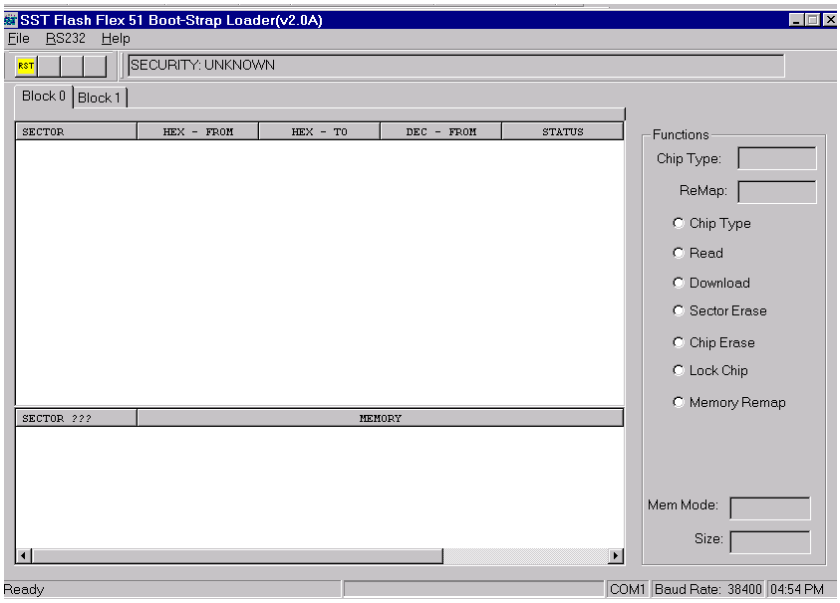
1-2. Check that the SST89C58 (PDIP) chip is inserted correctly in the ZIF socket (U1) – the notch of chip lines up with the latch handle of socket.
1-3. Insure the SST39SF010 MPF (PLCC) chip is firmly inserted into the PLCC socket (U3).
1-4. Connect the serial cable between the Demo board and the COM port of user PC.
1-5. Connect the barrel connector to the board and plug the AC adapter into an AC power source. The yellow LED (D1, attached to port pin P1.0) and the red power indicator should be ON.

Step 2. Load Program Files from Floppy Disk into User PC
Refer to the above section of "Installing the Software".

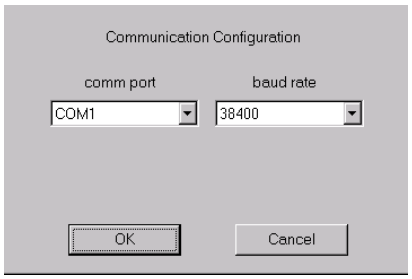
Step 3. Start to Run the BSL v2.0A Program
3-1. Click on the executable file **SSTFlashFlex51.EXE** to run the BSL v2.0A program and display the **Entry Menu**. If Window's Operating System displays the following error message, the user needs to copy two Microsoft Library files **MFC42.DLL** and **MSVCRT.DLL**, from the Windows floppy disk into the same folder as the executable file and restart the BSL executable program.



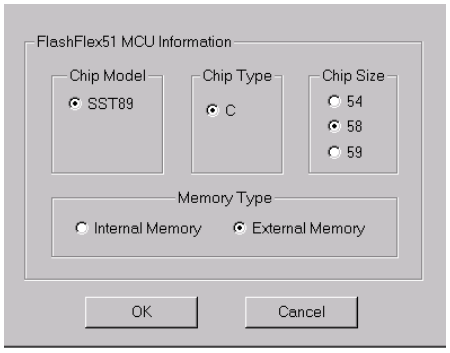
The following **Entry Menu** will appear:



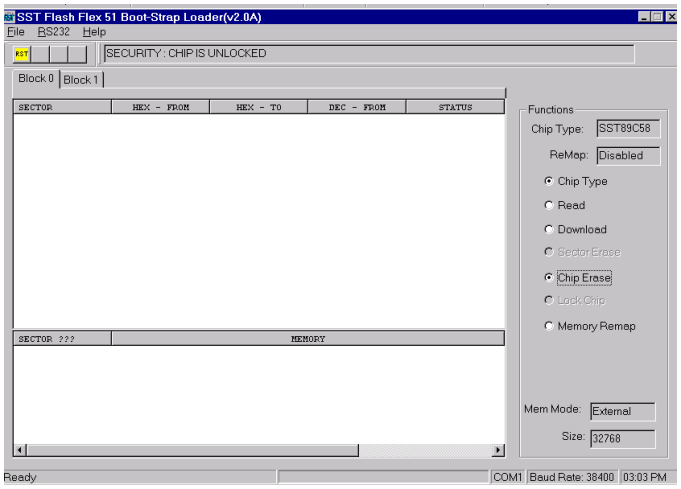
3-2. Click on the RS232 menu and select the desired COM port and baud rate:



3-3. Click on the **Chip Type** in the box area of *Functions* to set Chip Model, Chip Type, Chip Size and Memory Type. Then click on OK to exit menu.



The following menu for **External Memory Mode** will appear:

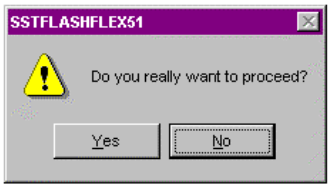


Step 4. Erase the Entire Flash Memory in External Memory Mode

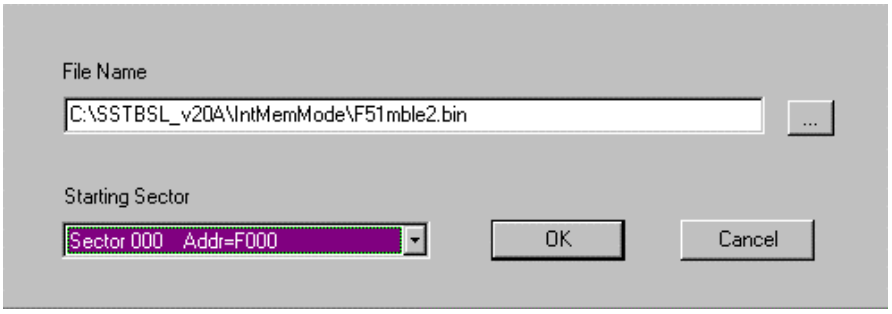
4-1. Click on **Chip Erase** function and click on Yes when Windows asks: “Do you really want to proceed?”

4-2. Click on OK to exit Chip Erase when the message “Chip erase completed!” appears.

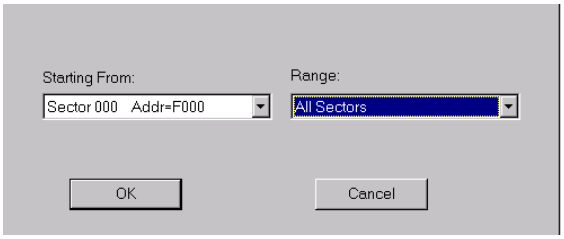
4-3. Next reset the Demo board.

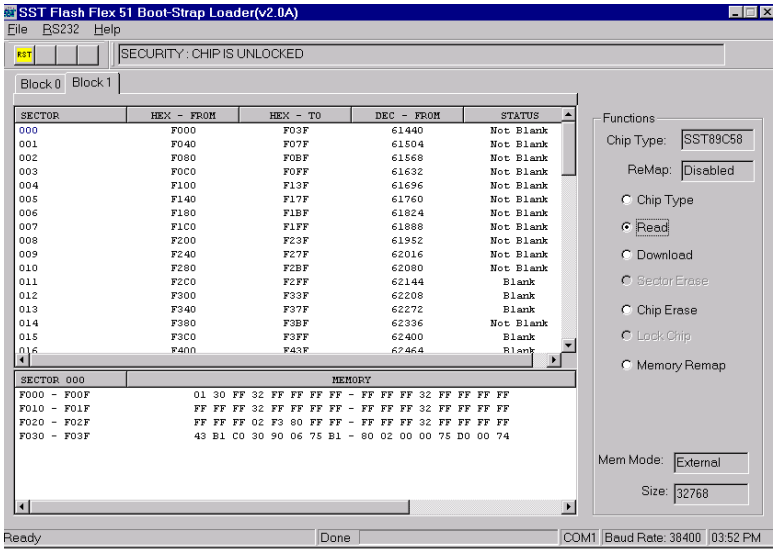


Step 5. Download the BSL Code into Block 1 Flash in External Memory Mode
5-1. Click on **Download,** then select the appropriate **File Name** and **Starting Sector**. The BSL binary code, **F51MBLE2.BIN** which is stored in the folder of **IntMemMode**, needs to be downloaded into block 1 at address F000h. The user needs to scroll down the list box of Starting Addresses and click on "**Sector 000 Addr=F000**".
5-2. Click on OK to exit menu and execute the download.



Step 6. Read BSL Code from Block 1 Flash in External Memory Mode
Click on **Read,** select the Start Address and Range, then click on OK.
The status of a sector could be one of three conditions – *Blank*, *Not Blank* or *Not Available*. The content of a *Blank* sector shows all FFs. The content of a *Not Blank* sector shows the hex format of data; all non-program spaces in user code are filled with 00s. Hence, the content of an unread sector showing all 00s represents the status of *Not Available*.



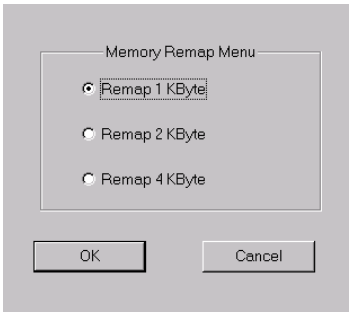

SST Flash Flex 51 Boot-Strap Loader(v2.0A)
File RS232 Help
SECURITY: CHIP IS UNLOCKED
Block 0 Block 1
SECTOR HEX - FROM HEX - TO DEC - FROM STATUS
000 F000 F03F 61440 Not Blank
001 F040 F07F 61504 Not Blank
002 F080 F0BF 61568 Not Blank
003 F0C0 F0FF 61632 Not Blank
004 F100 F13F 61696 Not Blank
005 F140 F17F 61760 Not Blank
006 F180 F1BF 61824 Not Blank
007 F1C0 F1FF 61888 Not Blank
008 F200 F23F 61952 Not Blank
009 F240 F27F 62016 Not Blank
010 F280 F2BF 62080 Not Blank
011 F2C0 F2FF 62144 Blank
012 F300 F33F 62208 Blank
013 F340 F37F 62272 Blank
014 F380 F3BF 62336 Not Blank
015 F3C0 F3FF 62400 Blank
SECTOR 000 MEMORY
F000 - F00F 01 30 FF 32 FF FF FF FF - FF FF FF 32 FF FF FF FF
F010 - F01F FF FF FF 32 FF FF FF FF - FF FF FF 32 FF FF FF FF
F020 - F02F FF FF FF 02 F3 80 FF FF - FF FF FF 32 FF FF FF FF
F030 - F03F 43 B1 C0 30 90 06 75 B1 - 80 02 00 00 75 D0 00 74
Functions
Chip Type: SST89C58
ReMap: Disabled
Chip Type
Read
Download
Sector Erase
Chip Erase
Lock Chip
Memory Remap
Mem Mode: External
Size: 32768
Ready
Done
COM1 Baud Rate: 38400 03:52 PM

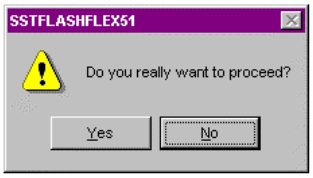
Step 7. Activate Memory Remapping in External Memory Mode

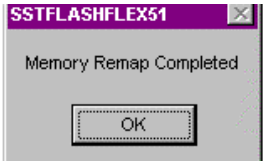
7-1. Click on **Memory Remap,** then select the **Remap 1 Kbyte** option and click OK.

7-2. Click Yes to redirect address range 0000h-03FFh to F000h-F3FFh when Windows asks: “Do you really want to proceed?”

7-3. Click OK to exit menu when the message “Memory Remap Completed” appears.

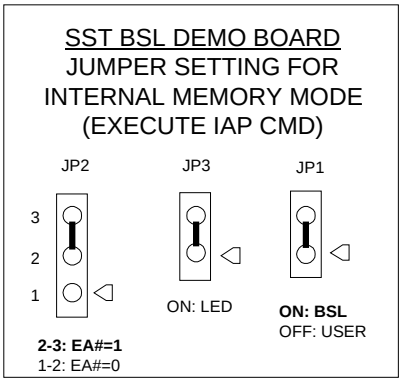




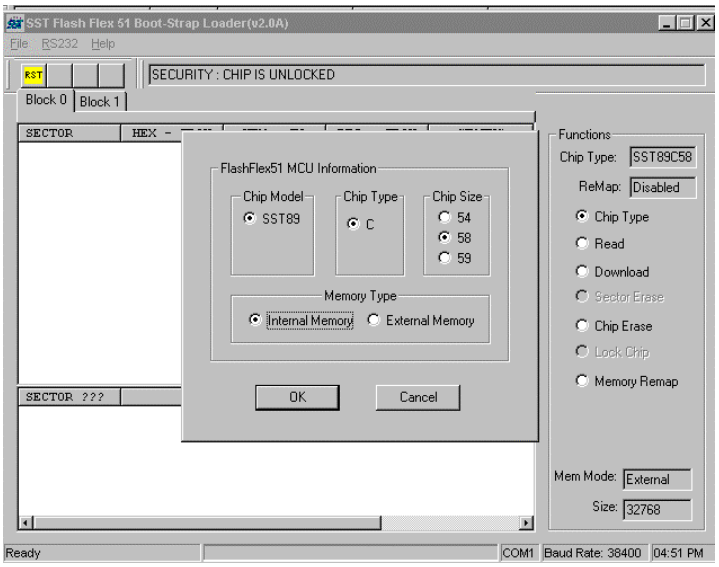


Step 8. Switch to Internal Memory Mode

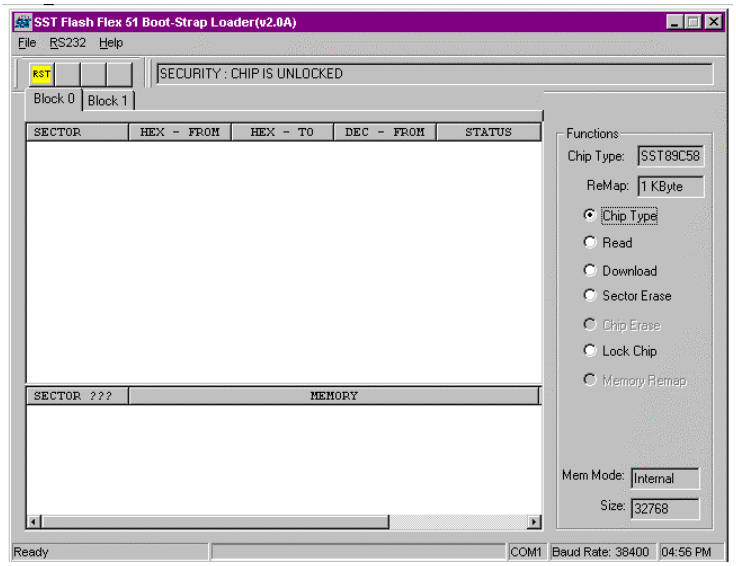
Change the jumper settings as shown in the following figure to enter **Internal Memory Mode**. Next reset the Demo board to activate the memory-remapping.



Click on **Chip Type** and select **the Internal Memory Mode**. Then click OK.

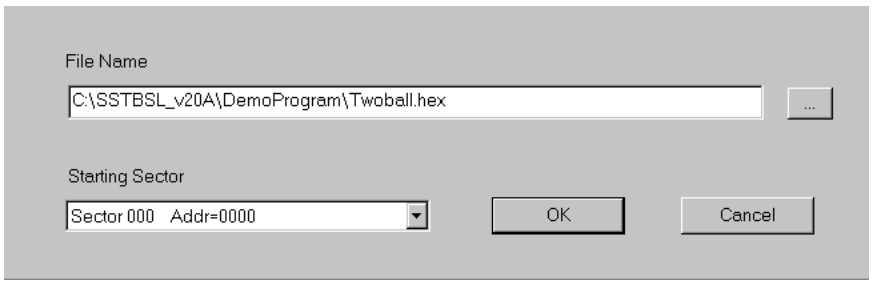


The following menu for **Internal Memory Mode** will appear:

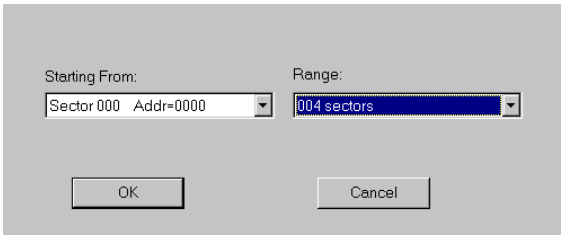


Step 9. Download Demo/User Program in Internal Memory Mode

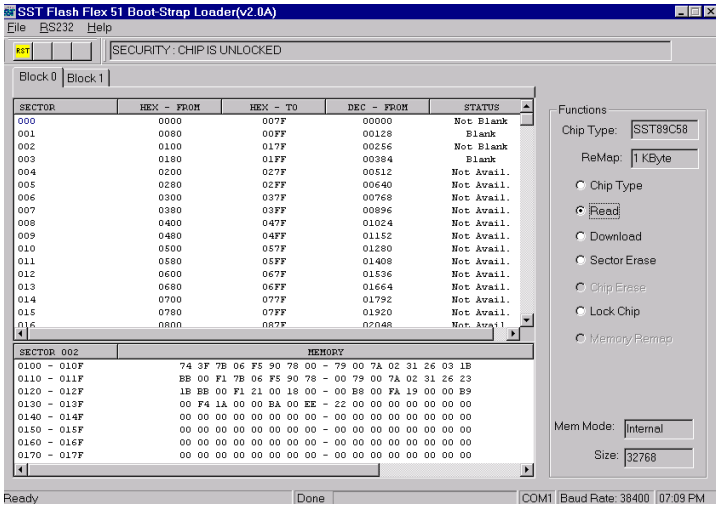
Click on **Download,** enter the Start Address (Sector 000 Addr=0000) and File Name, e.g. Twoball.hex. Click OK to download code.



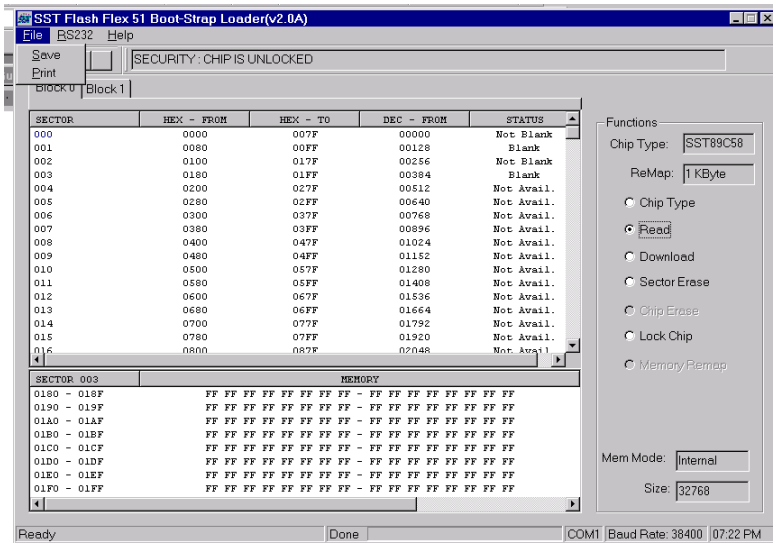
Step 10. Read Demo/User Code from Block 0 Flash in Internal Memory Mode
Click on **Read,** select the Start Address and Range (no. of sectors). Then click OK.



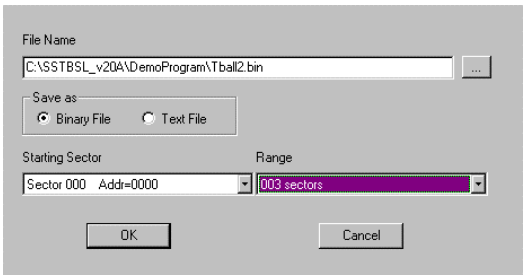
The Demo program Twoball.bin occupies three sectors, sector 000 through sector 002. User can click on sector number and the content of selected sector is shown in lower half of window.



Step 11. Save Data into a File (Upload) from Block 0 in Internal Memory Mode
To save data into a binary/text file, the user needs to click on File menu then the Save option.


SST Flash Flex 51 Boot-Strap Loader(v2.0A)
File RS232 Help
Save
Print
SECURITY : CHIP IS UNLOCKED
Block 0 Block 1
SECTOR HEX - FROM HEX - TO DEC - FROM STATUS
000 0000 007F 00000 Not Blank
001 0080 00FF 00128 Blank
002 0100 017F 00256 Not Blank
003 0180 01FF 00384 Blank
004 0200 027F 00512 Not Avail.
005 0280 02FF 00640 Not Avail.
006 0300 037F 00768 Not Avail.
007 0380 03FF 00896 Not Avail.
008 0400 047F 01024 Not Avail.
009 0480 04FF 01152 Not Avail.
010 0500 057F 01280 Not Avail.
011 0580 05FF 01408 Not Avail.
012 0600 067F 01536 Not Avail.
013 0680 06FF 01664 Not Avail.
014 0700 077F 01792 Not Avail.
015 0780 07FF 01920 Not Avail.
SECTOR 003 MEMORY
0180 - 018F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0190 - 019F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01A0 - 01AF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01B0 - 01BF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01C0 - 01CF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01D0 - 01DF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01E0 - 01EF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
01F0 - 01FF FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
Functions
Chip Type: SST89C58
ReMap: 1 KByte
Chip Type
Read
Download
Sector Erase
Chip Erase
Lock Chip
Memory Remap
Mem Mode: Internal
Size: 32768
Ready Done COM1 Baud Rate: 38400 07:22 PM

Enter a filename, starting address and number of sectors (in Range list box), then click OK. Click OK when the message “Save data has completed” appears.



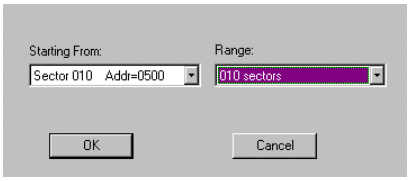
Step 12. Execute User/Demo Code in Internal Memory Mode

12-1. Remove the jumper from JP1. Reset the Demo board to start the execution of User/Demo program. Each demo program will light the LEDs in a unique pattern.

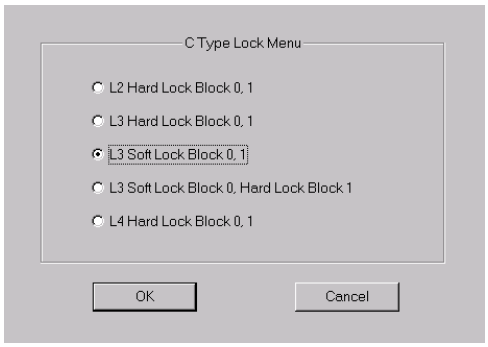
12-2.To return to **Internal Memory Mode**, the user needs to return the jumper to JP1, then reset the Demo board.

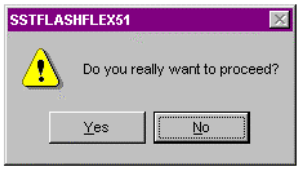
Step 13. Sector Erase in Internal Memory Mode

This option enables the user to select the region of primary block (block 0) to be erased. The user enters the starting address and number of sectors (in Range list box) to be erased, then clicks OK. Click OK when the Windows asks: ”Sector erase completed!”



Step 14. Lock Chip in Internal Memory Mode


C Type Lock Menu
L2 Hard Lock Block 0, 1
L3 Hard Lock Block 0, 1
L3 Soft Lock Block 0, 1
L3 Soft Lock Block 0, Hard Lock Block 1
L4 Hard Lock Block 0, 1
OK
Cancel



14-1. Click on **Lock Chip** option, select the level and type of lock, e.g. L3 Soft Lock Block 0,1, then click OK.

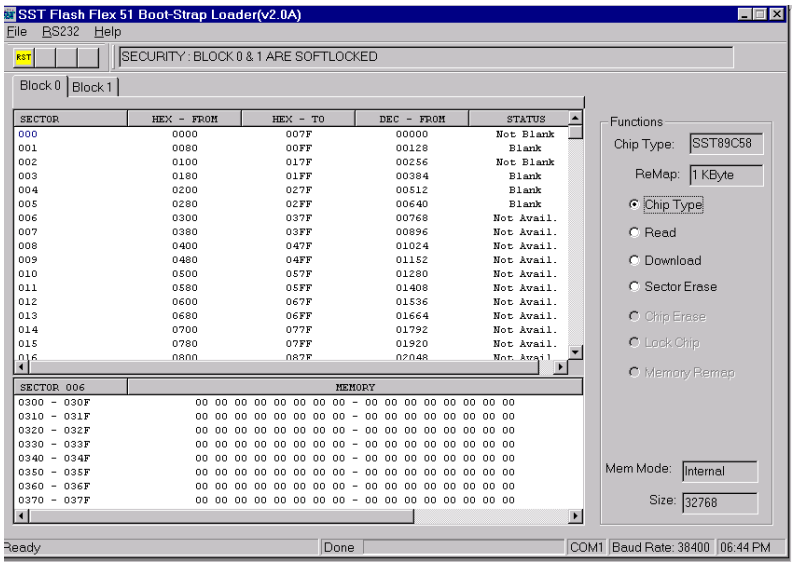
14-2. Click Yes when the screen asks: “Do you really want to proceed?”

14-3. Click OK to exit menu when the message “Set Lock Completed” displays.

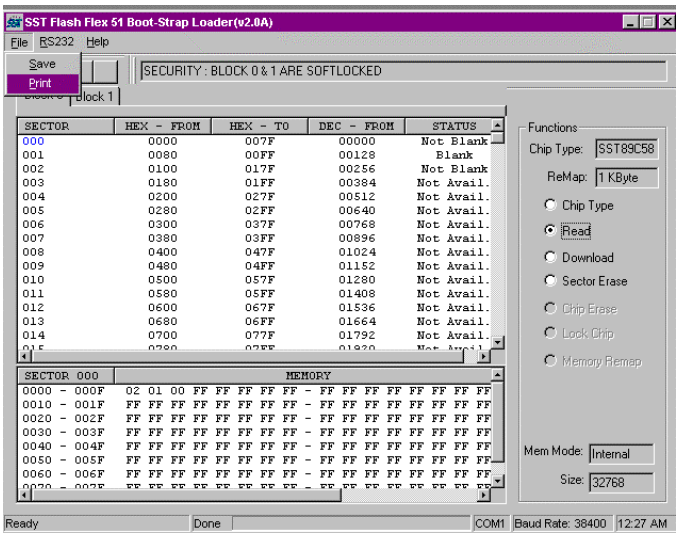
14-4. Reset the board to activate the security lock.
14-5. Select the **Chip Type** again (the procedure is listed in Step 8).

The chip can be soft or hard locked. Once the security lock is activated, only a **chip-erase** operation can deactivate the security lock. Please be aware that the #5 selection "**L4 Hard Lock Block 0, 1**" will activate the level-4 hard-lock, and only the chip-erase command issued in SST89C5x **External Host Mode** can unlock it.

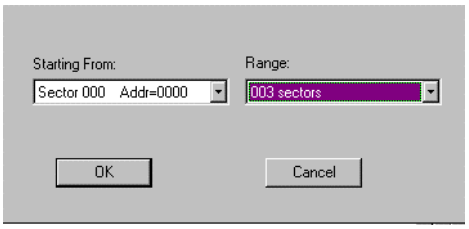
The **Lock Chip** option will no longer be shown once the Boot-Strap Loader detects the chip is Soft Locked; instead, a message: "SECURITY: Block 0 & 1 ARE SOFTLOCKED" will be displayed. The selection of '1', '2', or '5' Hard Lock commands prohibits the user from accessing IAP commands in **Internal Memory Mode** after the MCU has been reset.



Step 15. Print Memory Contents
Click on File menu, then click on Print option.


SST Flash Flex 51 Boot-Strap Loader(v2.0A)
File RS232 Help
Save
Print
SECURITY : BLOCK 0 & 1 ARE SOFTLOCKED
SECTOR HEX - FROM HEX - TO DEC - FROM STATUS
000 0000 007F 00000 Not Blank
001 0080 00FF 00128 Blank
002 0100 017F 00256 Not Blank
003 0180 01FF 00384 Not Avail.
004 0200 027F 00512 Not Avail.
005 0280 02FF 00640 Not Avail.
006 0300 037F 00768 Not Avail.
007 0380 03FF 00896 Not Avail.
008 0400 047F 01024 Not Avail.
009 0480 04FF 01152 Not Avail.
010 0500 057F 01280 Not Avail.
011 0580 05FF 01408 Not Avail.
012 0600 067F 01536 Not Avail.
013 0680 06FF 01664 Not Avail.
014 0700 077F 01792 Not Avail.
SECTOR 000 MEMORY
0000 - 000F 02 01 00 FF FF FF FF FF - FF FF FF FF FF FF FF FF
0010 - 001F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0020 - 002F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0030 - 003F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0040 - 004F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0050 - 005F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0060 - 006F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
Functions
Chip Type: SST89C58
ReMap: 1 KByte
Chip Type
Read
Download
Sector Erase
Chip Erase
Lock Chip
Memory Remap
Mem Mode: Internal
Size: 32768
Ready
Done
COM1
Baud Rate: 38400
12:27 AM

Next enter the starting address, number of sectors (in Range list box) and click OK. Click OK again after the Print command is completed.



The hard copy of the Demo program Twoball.bin, range from 0000h to 017Fh, is shown in hex format as:

0000 – 000F 02 01 00 FF FF FF FF FF – FF FF FF FF FF FF FF FF
0010 – 001F FF FF FF FF FF FF FF FF – FF FF FF FF FF FF FF FF

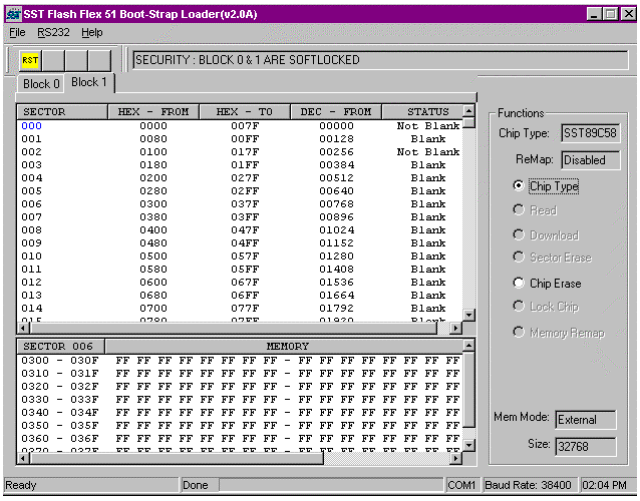
(All blanks from 0010h to 00FFh)

0100 – 010F 74 3F 7B 06 F5 90 78 00 – 79 00 7A 02 31 26 03 1B
0110 – 011F BB 00 F1 7B 06 F5 90 78 – 00 79 00 7A 02 31 26 23
0120 – 012F 1B BB 00 F1 21 00 18 00 – 00 B8 00 FA 19 00 00 B9
0130 – 013F 00 F4 1A 00 00 BA 00 EE – 22 00 00 00 00 00 00 00

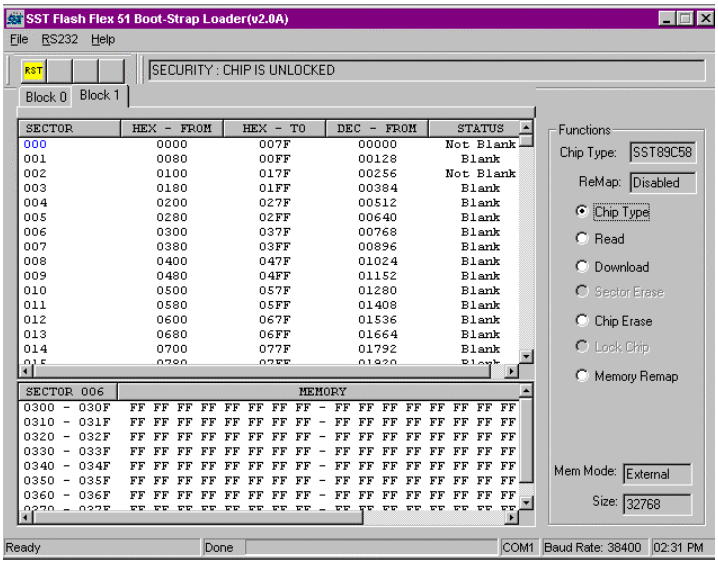
All 00s for non-program space from 0139h to 017Fh)

Step 16. Return to External Memory Mode after Soft-Locked the Chip
16-1. Prepare the Demo Kit as delineated in Step 1. Set the jumpers for **External Memory Mode**, then reset the board.
16-2. Click on **Chip Type** and click OK when the following message appear:

16-3. The **External Memory Mode** can't be executed if the Boot-Strap Loader detects any type of security lock is activated; the user would need to click on **Chip Erase** to continue in this mode.


SST Flash Flex 51 Boot-Strap Loader(v2.0A)
File RS232 Help
SECURITY : BLOCK 0 & 1 ARE SOFTLOCKED
Block 0 Block 1
SECTOR HEX - FROM HEX - TO DEC - FROM STATUS
000 0000 007F 00000 Not Blank
001 0080 00FF 00128 Blank
002 0100 017F 00256 Not Blank
003 0180 01FF 00384 Blank
004 0200 027F 00512 Blank
005 0280 02FF 00640 Blank
006 0300 037F 00768 Blank
007 0380 03FF 00896 Blank
008 0400 047F 01024 Blank
009 0480 04FF 01152 Blank
010 0500 057F 01280 Blank
011 0580 05FF 01408 Blank
012 0600 067F 01536 Blank
013 0680 06FF 01664 Blank
014 0700 077F 01792 Blank
SECTOR 006 MEMORY
0300 - 030F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0310 - 031F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0320 - 032F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0330 - 033F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0340 - 034F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0350 - 035F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0360 - 036F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
Functions
Chip Type: SST89C58
ReMap: Disabled
Chip Type
Read
Download
Sector Erase
Chip Erase
Lock Chip
Memory Remap
Mem Mode: External
Size: 32768
Ready
Done
COM1
Baud Rate: 38400
02:04 PM

16-4. Follow the procedure listed in Step 4 to execute the **Chip Erase** command.
16-5. Reset the board and bring up the **External Memory Mode**.


SST Flash Flex 51 Boot-Strap Loader(v2.0A)
File RS232 Help
SECURITY : CHIP IS UNLOCKED
Block 0 Block 1
SECTOR HEX - FROM HEX - TO DEC - FROM STATUS
000 0000 007F 00000 Not Blank
001 0080 00FF 00128 Blank
002 0100 017F 00256 Not Blank
003 0180 01FF 00384 Blank
004 0200 027F 00512 Blank
005 0280 02FF 00640 Blank
006 0300 037F 00768 Blank
007 0380 03FF 00896 Blank
008 0400 047F 01024 Blank
009 0480 04FF 01152 Blank
010 0500 057F 01280 Blank
011 0580 05FF 01408 Blank
012 0600 067F 01536 Blank
013 0680 06FF 01664 Blank
014 0700 077F 01792 Blank
SECTOR 006 MEMORY
0300 - 030F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0310 - 031F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0320 - 032F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0330 - 033F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0340 - 034F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0350 - 035F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
0360 - 036F FF FF FF FF FF FF FF FF - FF FF FF FF FF FF FF FF
Functions
Chip Type: SST89C58
ReMap: Disabled
Chip Type
Read
Download
Sector Erase
Chip Erase
Lock Chip
Memory Remap
Mem Mode: External
Size: 32768
Ready
Done
COM1
Baud Rate: 38400
02:31 PM

Now the user can follow the procedure provided in Step 5 to download the BSL code into block 1.

DOS

The following fourteen steps along with the Readme.pdf file (in folder “bslmcu11” on floppy disk v1.1D(DOS)) can be used as the guidelines to walk the user through setting the external/internal memory mode, downloading the BSL code or demo routines into internal flash memory, executing the memory-remap command, uploading the data from

internal flash memory and saving them as a disk file, and locking the MCU chip. There are 11 figures in the Readme.pdf file and these figures are referenced in the following steps.

Step 1. Prepare the Demo Kit for Running SST BSL v1.1D Program
1.1. Follow the procedure listed in Step 1 in the Windows section.

Step 2. Start to run the BSL v1.1D Program
2-1. Close all Windows programs and exit to DOS.
2-2. From the DOS prompt, change to the newly created sub-directory by typing:
"C:\> cd \c58-11mh <enter>"
2-3. Run the PC executable program by typing:
"C:\C58-11MH>f51pblb3 <enter>"

Step 3. Select the External Memory Mode from Entry Menu
3-1. Enter '2' to select "External Memory Mode" on the Entry Menu.
Refer to "Figure 2. Menu Driven User Interface of the Boot-Strap Loader(v1.1D)" in Readme.pdf.
3-2. Enter '58', '1' and '1' to select Chip Number, COM Port and Baud Rate.
Refer to "Figure 8. Step-by-Step Example of Selecting Chip Number 89C58 and COM Port 1 in External Memory Mode of Boot-Strap Loader(v1.1D for 39SF010)".

Step 4. Erase the Entire Flash Memory in External Memory
4-1. On the External Memory Mode Sub-Menu, enter '4' to execute chip-erase command. Enter 'y' or 'Y' to proceed when the screen asks: "Proceed Chip_Erase command? (Y/N)".
4-2. Next reset the Demo board.

Step 5. Download the BSL Code into Block 1 Flash in External Memory Mode
5-1. Enter '2' to download code into Block 0/1 Flash.
Refer to "Figure 11. Step-by-Step Example of Download BSL Code(v1.1D for 89C58 into Block 1 and Re-mapping 1 KB of Flash in Ext. Mem. Mode".

Step 6. Upload BSL Code from Block 1 Flash in External Memory Mode
6-1. Enter '3' to upload data from Block 0/1 Flash.
6-2. Enter 'n' or 'N' to skip the creation of a text format file.
6-3. Enter "bsl_blk1.bin" when the screen asks: "Input full name of file: ".
6-4. Enter "f000" when the screen asks: "Enter start address(in 40H/80H increments): ".
6-5. Enter "400" when the screen asks: "Enter number of bytes to read in Hex: ". The 400H is an estimated value of the BSL code size.

Step 7. Activate Memory Remapping in External Memory Mode
7.1. Enter '5' to execute memory_remap command.
Refer to the figure mentioned at Step 5-1.

Step 8. Switch to Internal Memory Mode
8-1. Make the jumper settings listed in “Step 8” of the Windows section.
8-2. Reset the Demo board to activate the memory-remapping.
8-3. Enter ‘0’ to return to Entry Menu
8-4. Enter ‘1’ to switch to Internal Memory Mode.
8-5. Follow “Step 3-2” for the selection of Chip Number, COM Port and Baud Rate.

Step 9. Download Demo/User Program in Internal Memory Mode
9.1. In the Readme file (DOS), follow the sequence listed in “Figure 9. Step-by-Step Example of Downloading BSL Demo code into block 0 and Executing the Demo code in Internal Memory Mode”.

Step 10. Upload Demo/User Code from Block 0 Flash in Internal Memory Mode
10.1. In the Readme file (DOS), follow the sequence listed in “Figure 10. Step-by-Step Example of Uploading a BSL Demo code from block 0 into a disk file in Internal Memory Mode”.

Step 11. Blank Check in Internal Memory Mode
11-1. Enter a valid starting address (in Hex), e.g. 1000, when the screen asks:
“Enter start address (should be in 80H increments): “.
11-2. Enter a valid number of sectors (in decimal), e.g. 40, when the screen asks:
“Enter the number of sectors (in decimal) to be checked: “.
11-3. The program displays the message “SPECIFIED SECTOR OR SECTORS ARE ALL BLANK!” at the STATUS field if the region to be checked are all blanks. Otherwise, the message “SPECIFIED SECTOR OR SECTORS ARE NOT BLANK!” is displayed.

Step 12. Execute User/Demo Code in Internal Memory Mode
12.1. Follow the procedure listed in Step 12 in the Windows section.

Step 13. Sector Erase in Internal Memory Mode
13-1. Enter a valid starting address (in Hex), e.g. 1000, when the screen asks:
“Enter start address (should be in 80H increments): “.
13-2. Enter a valid number of sectors (in decimal), e.g. 40, when the screen asks:
“Enter the number of sectors (in decimal) to be erased: “.
13-3. The program displays the message “SUCCESS IN SECTOR ERASING!” at the STATUS field after a success operation achieved. Otherwise, the message “SECTOR ERASE FAILURE!” is displayed.

Step 14. Lock Chip in Internal Memory Mode
14-1. Enter ‘6’ to Lock Chip.
14-2. Referring to “Figure 6. Sub-Menu Flowchart of Security Lock for the BSL v1.1D”, select the type of security lock, e.g. “3. L3 SoftLock block 0&1”.
14-3. Reset the Demo board.
14-4. Enter ‘0’ to return to Entry Menu, then enter ‘1’ to switch to Internal Mem. Mode.
14-5. Follow “Step 3-2” for the selection of Chip Number, COM Port and Baud Rate.

14-6. The BSL program detects the status of security lock and displays it in the STATUS field.

Demo Software

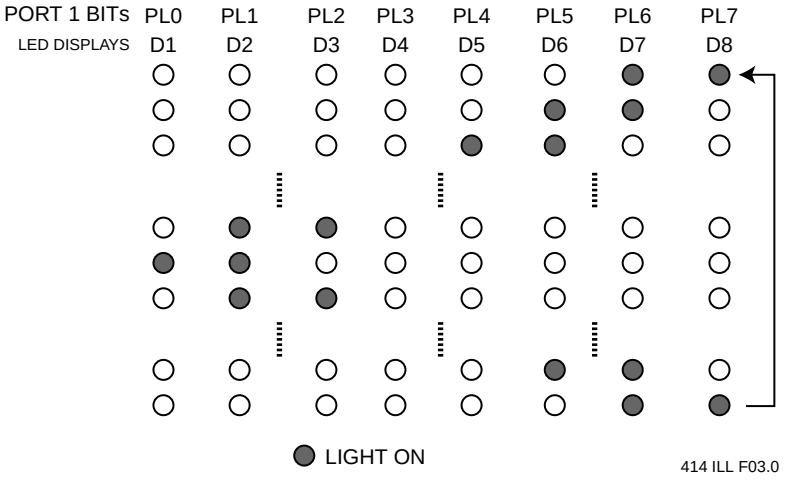
Three demo software programs have been supplied with the BSL Demo Kit, and the intent here is provide the user with some understanding of their basic functionality. Any one of them can be downloaded from the PC to the Demo Board, and executed there. For a visible presence on the demo board, each of the demo routines manipulates the board LEDs in some manner. The source (.A51) and download (.HEX) files for each of the three software routines are included on the kit floppy disk.

The file names are:
1) TWOBALL.A51/.HEX
2) BINCTR.A51/HEX
3) PENDB.A51/HEX

TWOBALL

The "twoball" routine corresponds to a two-ball bouncing ball sequence, that is, the two most significant LEDs will light up and proceed to shift right one LED bit position at a specific time interval. When the lighted pair reaches the two least significant bit positions, then they will begin to shift left in the same manner. The right-left sequence will be continuous, and is illustrated in the following diagram:

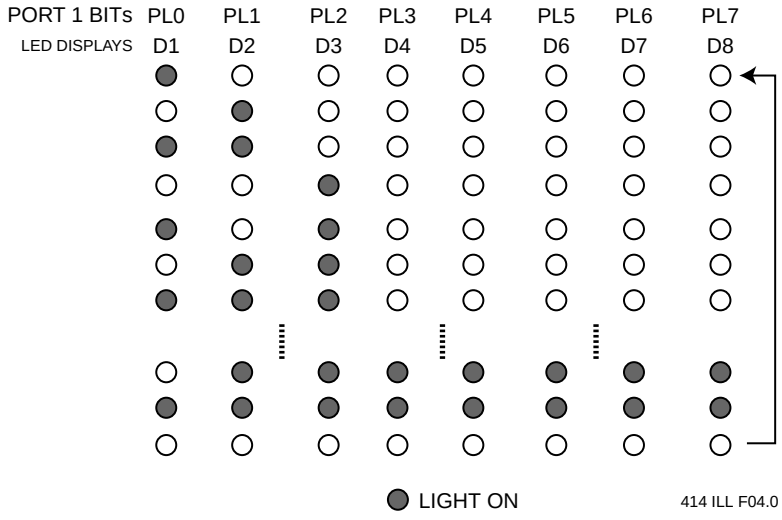
TWOBALL DEMO:



BINCTR

The "binctr" routine shows a binary counting sequence on the LEDs, which are changing at a specific time interval. Some of the counting states are illustrated in the following diagram:

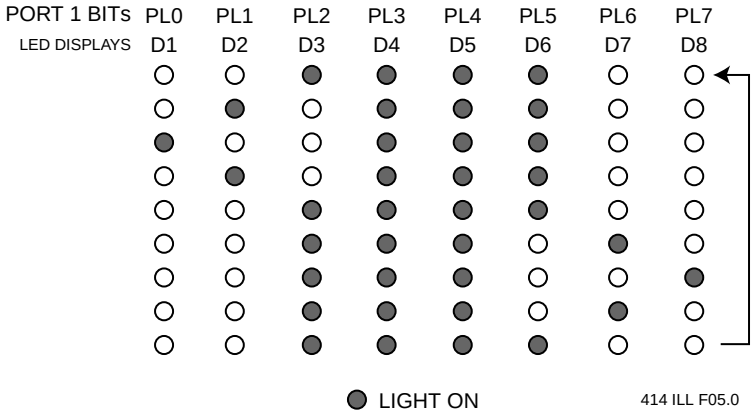
BINCTR DEMO:



PENDB

The "pendb" software routine causes the LEDs to behave similar to a pendulum. Like the previous routines discussed, the LEDs are changing at a specific time interval visible to the user. The LED pattern is shown in the following diagram:

PENDB DEMO:



Step-By-Step Procedure for Quick Demo

The purpose of this procedure is to provide the user with the sequence of steps to quickly demonstrate the Boot-Strap Loader(BSL) Demo Kit software under Windows 95/98. It assumes that the user has previously become familiar with the kit, and needs this step-by-step procedure as a refresher. It further assumes that the BSL Demo Kit software has already been installed on the user's PC and that the MCU does not contain any BSL code.

The procedure will sequence through the following functions:

set up demo system, erase the chip, download the BSL code and activate memory re-mapping in **External Memory Mode**;

download one of the three demo programs in **Internal Memory Mode**, and finally, execute the downloaded demo program on the Demo board.

Set up Demo System

1. Set up the BSL Demo board for External Memory Mode operation.
   a. Realize the following jumper settings on the Demo board:
      JP1: Closed
      JP2: 1 + 2
      JP3: Closed
   b. Connect the RS-232 DB-9 cable between the Demo board and PC.
   c. Connect the AC adapter to the Demo board.

2. Start the PC software.
   a. Run the BSL v2.0A executable program: FlashFlex51.exe
   b. The Entry Menu will appear.

3. Select COM port, baud rate, chip type and memory mode.
   a. On the Entry Menu, click on the RS-232 option then select the desired COM port and baud rate. COM1 and 38.4Kbits/second are the default values. Click OK to exit menu.
   b. Next click on the Chip Type in the Functions area of the Entry Menu. From its menu, select the chip model (SST89), type (C) and size (58) as well as the memory type (External Memory). Click OK to exit menu.
   c. The External Memory Mode menu now appears, which means that the system is setup and ready to execute any of the External Memory Mode command functions.

Erase All MCU Flash Memory

1. Under Functions on the External Memory Mode menu, click on Chip Erase and click on Yes when Windows asks: "Do you want to proceed?"
2. Click on OK to exit Chip Erase when the message "Chip erase completed!" appears.
3. Next reset the Demo board.

Download the BSL Code into Block 1 Flash Memory

1. Under Functions on the External Memory Mode menu, click on Download , then select the appropriate File Name and Starting Sector. The BSL code file name is f51mble2.bin, which is in the **IntMemMode** folder. For Starting Address, click on "Sector 000 ADDR=F000". Click on OK to exit menu and execute the download.
2. The BSL code now resides in Block 1 Flash memory.

Activate Memory Re-mapping in External Memory Mode

1. Click on Memory Remap, then select the Remap 1Kbyte option and click OK.
2. Click Yes to redirect address range 0000h-03FFh to F000h-F3FFh when Windows asks: "Do you really want to proceed?"
3. Click OK to exit menu when the message "Memory Remap Completed" appears.

Switch to Internal Memory Mode

1. Change the Demo board jumper JP2 setting to the following:
   JP2: 2 + 3
2. Next reset the Demo board to activate the memory re-mapping.
3. Click on Chip Type and select the Internal Memory Mode. Then click OK.
4. The Internal Memory Mode menu now appears.

Download a Demo Program in Internal Memory Mode

1. On the Internal Memory Mode menu, click on Download.
2. Enter the File Name. From the **DemoProgram** folder, choose one of the three demo programs listed there: **twoball.hex**, **binctr.hex** or **pendb.hex**.
3. From the Starting Sector options, select Sector 000 Addr=0000. Click on OK to execute the download.

Execute Demo Program on Demo Board

1. Remove the JP1 jumper (JP1: Open) to run user code.
2. Reset the Demo board to cause the MCU to begin executing the downloaded demo program.
3. Now the LED bank will be showing the unique lighting activity associated with the selected demo program.